

CLAIMS

1. A light-emitting unit comprising:

5 a substrate including an obverse surface and a reverse surface;

a first light-emitting element mounted on the obverse surface of the substrate, and a second light-emitting element mounted on the reverse surface of the substrate;

10 a first lens arranged for dispersion of light and enclosing the first light-emitting element, and a second lens arranged for dispersion of light and enclosing the second light-emitting element; and

15 a first wiring pattern formed on the obverse surface of the substrate, and a second wiring pattern formed on the reverse surface of the substrate;

wherein each lens includes a periphery which is adjacent to at least a part of an edge of the substrate.

20 2. The unit according to claim 1, wherein the periphery of each lens is circular, the edge of the substrate including an arcuate portion extending along the circular periphery of said each lens.

25 3. The unit according to claim 1, wherein the dispersion of light for each lens is provided by causing said each lens to contain light-dispersing particles.

4. The unit according to claim 1, further comprising a reflecting layer arranged between each lens and the substrate, wherein the reflecting layer is formed with an opening in which the substrate is partially exposed, and
5 wherein the substrate is made of a transparent material.

5. The unit according to claim 1, wherein the substrate has a rectangular configuration including a first end and a second end which are spaced apart from each other, the first
10 end being provided with a first terminal, the second end being provided with a second terminal, and wherein each light-emitting element and each lens are disposed in a central region of the substrate between the first terminal and the second terminal.

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6. The unit according to claim 1, further comprising an additional light-emitting element mounted on the obverse surface of the substrate and enclosed by the first lens, wherein the first light-emitting element and the additional
20 light-emitting element are energized through different current paths independent of each other.

7. The unit according to claim 6, wherein the first light-emitting element and the additional light-emitting element
25 are connected with opposite polarities.

8. The unit according to claim 1, further comprising a black layer covering at least part of the substrate between the

periphery of the lens and the edge of the substrate.

9. The unit according to claim 1, wherein each light-emitting element includes a supporting base, a light-emitting diode chip mounted on the base, and a transparent resin member enclosing the chip.

10. The unit according to claim 9, wherein the base has an elongated rectangular configuration and a center line that extends longitudinally of the base, the center line passing through a center of the lens.

11. The unit according to claim 1, wherein each light-emitting element includes a light-emitting diode chip diebonded to a corresponding one of the wiring patterns, and a metal wire connected to the chip.

12. The unit according to claim 11, wherein the metal wire is arranged to extend along a straight line passing through a center of the lens.

13. An illuminator comprising:

a substrate including an obverse surface and a reverse surface;

a first light-emitting element mounted on the obverse surface of the substrate, and a second light-emitting element mounted on the reverse surface of the substrate;

a first lens arranged for dispersion of light and

enclosing the first light-emitting element, and a second lens arranged for dispersion of light and enclosing the second light-emitting element;

a first wiring pattern formed on the obverse surface
5 of the substrate, and a second wiring pattern formed on the reverse surface of the substrate;

a base connected to the wiring patterns; and

an envelope for accommodating the substrate, the light-emitting elements, the lenses and the wiring patterns;

10 wherein each lens includes a periphery which is adjacent to at least a part of an edge of the substrate.

14. The illuminator according to claim 13, wherein the periphery of each lens is circular, the edge of the
15 substrate including an arcuate portion extending along the circular periphery of said each lens.

15. The illuminator according to claim 13, further comprising an additional light-emitting element mounted on
20 the obverse surface of the substrate and enclosed by the first lens, wherein the first light-emitting element and the additional light-emitting element are energized through different current paths independent of each other.

25 16. The illuminator according to claim 15, wherein the first light-emitting element and the additional light-emitting element are connected with opposite polarities.

17. The illuminator according to claim 13, further comprising a black layer covering at least part of the substrate between the periphery of the lens and the edge of the substrate.

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18. The illuminator according to claim 13, wherein each light-emitting element includes a supporting base, a light-emitting diode chip mounted on the supporting base, and a transparent resin member enclosing the chip.

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19. The illuminator according to claim 18, wherein the supporting base has an elongated rectangular configuration and a center line that extends longitudinally of the supporting base, the center line passing through a center of the lens.

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20. The illuminator according to claim 13, wherein each light-emitting element includes a light-emitting diode chip diebonded to a corresponding one of the wiring patterns, and a metal wire connected to the chip.

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